
High-efficient generation of induced pluripotent stem cells from human astrocytes.

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Public Summary:

It is well established that fibroblast cells from human skin can be readily reprogrammed to human induced pluripotent stem cells (hiPSCs). Here, we show that human astrocytes can also be reprogrammed into hiPSCs with similar efficiencies to keratinocytes, which are currently reported to have one of the highest somatic reprogramming efficiencies. Astrocyte derived hiPSCs are capable of self-renewal, express markers of pluripotency and can differentiate into cells from all three embryonic germ layers. Our data demonstrates that a human differentiated neural cell type can be reprogrammed to pluripotency and is consistent with the universality of the somatic reprogramming procedure.

Scientific Abstract:

The reprogramming of human somatic cells to induced pluripotent stem (hiPS) cells enables the possibility of generating patient-specific autologous cells for regenerative medicine. A number of human somatic cell types have been reported to generate hiPS cells, including fibroblasts, keratinocytes and peripheral blood cells, with variable reprogramming efficiencies and kinetics. Here, we show that human astrocytes can also be reprogrammed into hiPS (ASThiPS) cells, with similar efficiencies to keratinocytes, which are currently reported to have one of the highest somatic reprogramming efficiencies. ASThiPS lines were indistinguishable from human embryonic stem (ES) cells based on the expression of pluripotent markers and the ability to differentiate into the three embryonic germ layers in vitro by embryoid body generation and in vivo by teratoma formation after injection into immunodeficient mice. Our data demonstrates that a human differentiated neural cell type can be reprogrammed to pluripotency and is consistent with the universality of the somatic reprogramming procedure.

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